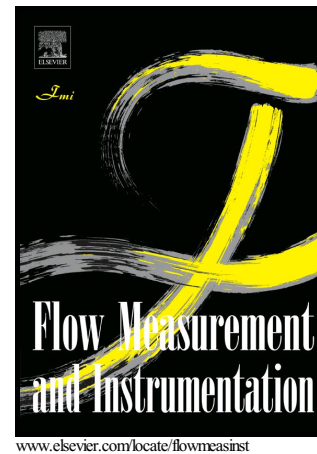


Sensitivity of X-ray Computed Tomography  
Measurements of a Gas-Solid Flow to Variations in  
Acquisition Parameters

Timothy B. Morgan, Theodore J. Heindel



PII: S0955-5986(16)30215-1  
DOI: <http://dx.doi.org/10.1016/j.flowmeasinst.2016.10.011>  
Reference: JFMI1278

To appear in: *Flow Measurement and Instrumentation*

Received date: 10 June 2016  
Revised date: 6 October 2016  
Accepted date: 28 October 2016

Cite this article as: Timothy B. Morgan and Theodore J. Heindel, Sensitivity of X-ray Computed Tomography Measurements of a Gas-Solid Flow to Variations in Acquisition Parameters, *Flow Measurement and Instrumentation*, <http://dx.doi.org/10.1016/j.flowmeasinst.2016.10.011>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# **Sensitivity of X-ray Computed Tomography Measurements of a Gas-Solid Flow to Variations in Acquisition Parameters**

Timothy B. Morgan, Theodore J. Heindel

Department of Mechanical Engineering, Iowa State University, Ames, Iowa, 50011, USA

tbmorgan@iastate.edu and theindel@iastate.edu

## **Abstract**

Due to its high spatial resolution and non-invasive nature, X-ray computed tomography has become a popular method for determining the flow characteristics of multiphase flows. However, because many of the X-ray computed tomography systems used for non-destructive imaging of multiphase flows provide the operator wide leeway in the selection of imaging parameters, the potential exists for errors to be introduced into the measurements if the algorithms are sensitive to these changes. In this paper, a representative multiphase flow (specifically, a fluidized bed) is imaged with a wide range of X-ray tube electrical potentials, currents, and detector exposure times and reconstructed with a wide range of centers of rotation. The results of these tests show that while the raw CT intensities are sensitive to these parameter variations, once the measurements are calibrated to reference images (in this case through a void fraction calculation), the final results are insensitive to most changes. In the extreme cases where there is some sensitivity to the parameter changes, the causes and practical implications are discussed.

Keywords: X-ray Computed Tomography, Measurement Sensitivity, Non-Invasive Flow

Imaging

Download English Version:

<https://daneshyari.com/en/article/5001807>

Download Persian Version:

<https://daneshyari.com/article/5001807>

[Daneshyari.com](https://daneshyari.com)